



MR 22/2021

**SUPPLY OF ONE 11kV/0.415kV, 100kVA GROUND-
MOUNTED DISTRIBUTION TRANSFORMER FOR
33kV/11kV ZONE SUBSTATION AT WAITOLU,
NAITASIRI**

ENERGY FIJI LIMITED

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REVISION HISTORY & DOCUMENT CONTROL

Rev No.	Notes	Prepared By	Reviewed & Approved By	Date of Issue
1	Issued for tender	KDP (ULSSP)		28/01/21

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1 INVITATION FOR TENDER

Energy Fiji Limited (“EFL”) is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavueni in Fiji. It owns over forty (40) power stations, substations and switching stations on the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau.

EFL is developing a new 33kV/11kV zone substation in Waitolu, Naitasiri. As part of this substation development, EFL is seeking bids from reputable manufacturers and suppliers for design, manufacture, testing and supply of one only 11kV/0.415kV, 100kVA, Dyn11, 50Hz ground-mounted distribution transformer for installation at its new zone substation for station auxiliary services.

All tenders for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices. Bids without completed returnable schedules will be viewed as unresponsive and will not be considered for evaluation.

During evaluation of tenders EFL may invite a tenderer or tenderers for discussions, presentations and any necessary clarification before awarding of the contract.

The tender submissions close at 1600hrs on 17th February 2021, Fiji Time.

Further information for this tender may be acquired from:

Jitendra Reddy
Unit Leader Strategic Procurement and Inventories
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 320
Facsimile: 679 331 6773
Email: jreddy@efl.com.fj

2 INSTRUCTIONS TO TENDERERS

2.1 Eligible Tenderers

This invitation is open to all Tenderers who have sound Financial Background, and have previous experience in supply of such transformers. Tenderers who are not manufacturers shall provide a letter of declaration from the manufacturer authorizing them to represent the nominated manufacturer.

Tenderers shall provide such evidence of their continued eligibility satisfactory to EFL as EFL shall reasonably request, using the forms provided in the Schedules.

Tenderers shall not be under a declaration of ineligibility for corrupt or fraudulent practice.

2.2 Eligible Materials, Equipment and Services

The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies as specified by EFL and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Tenderers shall be required to provide evidence of the origin of materials, equipment, and services in their bids.

For purposes of this Contract, "services" means the works and all project-related services including design services.

For purposes of this Contract, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

The materials, equipment and services to be supplied under the Contract shall not infringe or violate any industrial property or intellectual property rights or claim of any third party.

2.3 One Bid Per Tenderer

Each Tenderer shall submit only one bid. A Tenderer who submits or participates in more than one bid will cause all those bids to be rejected.

2.4 Cost of Bidding

The Tenderer shall bear all costs associated with the preparation and submission of its bid and EFL will in no case be responsible or liable for those costs.

2.5 Site Visits

No site visits are required for this project.

2.6 Contents of Bidding Documents

The Tenderer is expected to examine carefully the contents of this Bidding document. Failure to comply with the requirements of bid submission will be at the Tenderer's own risk. Bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

2.7 Clarification of Bidding Documents

A prospective Tenderer requiring any clarification of the bidding documents may notify EFL in writing by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex), or email addressed to:

Jitendra Reddy
Unit Leader Strategic Procurement and Inventories
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 320
Facsimile: 679 331 6773
Email: Abduln@efl.com.fj

EFL will respond to any request for clarification which it receives earlier than five (5) days prior to the deadline for submission of bids.

2.8 Amendment of Bidding Document

At any time prior to the deadline for submission of bids, EFL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the bidding documents by issuing addenda.

2.9 Language of Bid

The bid, and all correspondence and documents related to the bid, exchanged between the Tenderer and the EFL shall be written in the English language.

2.10 Bid Prices

Unless specified otherwise, Tenderers shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Supplier's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), testing and delivery.

Tenderers shall give a breakdown of the prices in the manner and detail called for in the Schedules of this bidding document, or any issued addenda.

Bids shall be given on DDU basis. The point of delivery shall be EFL's Kinoya Depot in Kinoya, Suva. The term DDU shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, Paris.

2.11 Bid Currencies

Prices shall be quoted in a single currency only.

2.12 Bid Validity

Bids shall remain valid for a period of **90 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 2.15.

2.13 Format and Signing of Bids

The Tenderer shall prepare one original and one (1) copies of the technical and financial proposals, clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - TECHNICAL & PRICE PROPOSAL", etc. as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.

The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

The Tenderer shall also provide one electronic copy of the Technical and Financial proposals on EFL's electronic tender hosting website, <https://www.tenderlink.com/efl> or on a portable storage device with the printed submissions.

The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by EFL, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be initialed by the person or persons signing the bid.

2.14 Sealing and Marking of Bids

The Tenderer shall seal the original copy of the technical proposal and the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - TECHNICAL & PRICE PROPOSAL", etc. as appropriate.

The Tenderer shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL", "COPY No. 1", etc.

The inner and outer envelopes shall

- a) be addressed to EFL at the following address:

Jitendra Reddy
Unit Leader Strategic Procurement and Inventories
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 320
Facsimile: 679 331 6773
Email: jreddy@efl.com.fj

And

- b) bear the following identification:

- Bid for: SUPPLY OF ONE 11kV/0.415KV, 100kVA GROUND-MOUNTED DISTRIBUTION TRANSFORMER FOR 33KV/11KV ZONE SUBSTATION AT WAITOLU, NAITASIRI
- Bid Tender Number: MR 22/2021
- DO NOT OPEN BEFORE: 1600hrs on 17th February 2021

In addition to the identification required, the inner envelope shall indicate the name and address of the Tenderer to enable the bid to be returned unopened in case it is declared "late" pursuant to Deadline for Submission of Bids.

If the outer envelope is not sealed and marked as above, EFL will assume no responsibility for the misplacement or premature opening of the bid.

2.15 Deadline for Submission of Bids

Bids must be received by EFL at the address specified above no later than 1600 hours (Fiji Time) 17th February 2021.

EFL may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of EFL and the Tenderers previously subject to the original deadline will thereafter be subject to the deadlines extended.

2.16 Late Bids

Any bid received by EFL after the deadline for submission of bids prescribed above will be rejected and returned unopened to the Tenderer.

2.17 Modification and Withdrawal of Bids

The Tenderer may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by EFL prior to the deadline for submission of bids.

The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with Sealing and Marking of Bids, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

No bid may be modified by the Tenderer after the deadline for submission of bids.

2.18 Rejection of One or All Bids

EFL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the rejection.

2.19 Process to be Confidential

Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process.

Any effort by a Tenderer to influence EFL's processing of bids or award decisions may result in the rejection of the Tenderer's bid.

Lowest bid will not necessarily be accepted as successful bid.

2.20 Clarification of Bids

To assist in the examination, evaluation and comparison of bids, EFL may, at its discretion, ask any Tenderer for clarification of its bid. The request for clarification and the response shall be in writing or by fax, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by EFL in the evaluation of the bids.

2.21 Compliance with Specifications

The tender shall be based on the equipment and work specified and shall be in accordance with the Technical Specification. It should be noted that unless departures from specifications are detailed in Schedule G of the Technical Specification, the tender would be taken as conforming to the Specification in its entirety. The Tenderer shall tender for the whole of the Works included in the Specification.

2.22 Signature of Tenderer

A tender submitted by a Partnership shall be signed by one of the members of the Partnership and shall be accompanied by a certified authorization of all the partners authorizing the individual partner to sign on behalf of the Partnership. A tender submitted by a Corporation to the Contract and shall be accompanied by a certified resolution of the Board of Directors authorizing the individual to sign on behalf of the Corporation.

2.23 Insurance

The Tenderer is to confirm that they have in effect the insurance policies below and provide copies of valid certificates with the bid:

1. Public and Products Liability Insurance
2. Insurance for Workmen's Compensation

3 GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be based upon AS 4911 – 2002 General Conditions of Contract for Supply of Equipment Without Installation.

The Conditions of Contract comprises two parts:

1. Part 1 – General Conditions; and
2. Part 2 – Conditions of Particular Application

4 CONDITIONS OF PARTICULAR APPLICATION

1. Interpretation and Construction of Contract

Add the following:

“Bid has the same meaning as tender.”

Replace

“qualifying cause of delay means

- a) any act, default or omission of the Purchaser, its consultants, agents or other contractors (not being employed by the Supplier); or*
- b) other than*
 - i) a breach or omission by the Supplier;*
 - ii) industrial conditions or inclement weather occurring after the due for delivery; and*
 - iii) stated in item 22”*

With

“qualifying cause of delay means a cause of delay other than that caused by

- a) a breach or omission by Supplier;*
- b) industrial conditions or inclement weather occurring after the due for delivery; and*
- c) a cause stated in item 22 “*

5. Service of notices

Replace *“ ii) confirmation of correct transmission of fax”*

With *“ ii) confirmation of correct electronic transmission”*

6. Contract Documents

Under 6 Contract Documents, make the following change:

Replace *“6.1 Discrepancies”* and contents in subclause 6.1 Discrepancies with the following,

“6.1 Discrepancies and Priority of Documents

The following priority of documents applies if there is any ambiguity, discrepancy or inconsistency in the documents comprising the Contract:

- a) Letter of Acceptance from Supplier*

- b) *Conditional Award Letter from Purchaser*
- c) *EFL Tender Addenda (if any issued, if not, remove this item from list)*
- d) *EFL Tender Specifications, including drawings*
- e) *Conditions of Particular Application to AS 4911-2003*
- f) *General Conditions of Contract AS 4911-2003*
- g) *Supplier's Tender Clarifications (if any provided by Supplier during tender evaluation, if not, remove this item from list)*
- h) *Supplier's Bid Document*

If either party discovers any inconsistency, ambiguity or discrepancy in any document prepared for the purpose of performing the Contract that party shall give the other party written notice of it. The Purchaser, thereupon, and upon otherwise becoming aware, shall direct the Supplier as to the interpretation and construction to be followed, with the priority order of documents above.

If compliance with any such direction under this subclause causes the Supplier to incur more or less cost than otherwise would have been incurred had the direction not been given, the difference shall be assessed by the Purchaser and added to deducted from the contract sum."

9. Warranties

Replace "9. *Designated Items*" and its contents with the following

9. Warranties

9.1 Ownership

The Supplier represents and warrants that:

- a) *It is the legal and beneficial owner of the goods; and*
- b) *that upon payment of the contract sum no person other than the Purchaser will be entitled to hold any interests in, or hold any encumbrance over, the goods.*

9.2 Supplier's Warranty

The Supplier represents and warrants that the goods will upon delivery:

- a) *comply in all respects with the Contract;*
- b) *be suitable for the purpose stated in Item 5;*
- c) *be of merchantable quality;*
- d) *conform to any sample provided by the Supplier and approved by the Purchaser.*
- e) *in the absence of any specific provision of the Contract, meet any relevant Australian Standard and industry best practice;*
- f) *be free of design defects;*
- g) *be, unless otherwise agreed, new.*

If the Supplier is in breach of any of the warranties in this clause 9, the Purchaser may, in addition to the Purchaser's other rights and remedies, at any time give 7 days' written notice to the Supplier to rectify such breach, and if the Supplier fails to comply with such notice, the Purchaser may employ others to carry out works required to satisfy the warranty. The cost thereby incurred shall be moneys due and payable to the Purchaser.

The representation and warranties in this clause survive the completion or earlier termination of the Contract and each warranty in this clause is independent of, and is not limited by, reference to any other warranty.

The Supplier shall obtain all warranties relevant to the goods from manufacturer or suppliers or as otherwise specified in the Contract, including any warranties that are provided by any sub-contract and ensure that the Purchaser has the benefit of those warranties. "

14. Directions

Add the following to 14 Directions, at the end,

"The Purchaser may appoint the individual stated in Item 1A to exercise delegated Purchaser's functions. The Purchaser may, from time to time, by notice in writing to the Supplier, substitute or appoint more than one such Purchaser's representative, provided that no aspect of any function shall at any time be the subject of delegation to more than one Purchaser's representative.

Every reference in the Contract to the Purchaser's representative shall include the Purchaser and vice versa."

17. Time

Under 17.2 Claim, make the following change

Replace

" a) delivery is or will be delayed by a qualifying cause of delay; and "

With

" a) delivery is or will be delayed by a qualifying cause of delay that includes but is not limited to any act, default or omission of the Purchaser, its consultants, agents or other contractors (not being employed by the Supplier; and "

19. Delivery

Add the following to 19.1 Mode of and Date and Place for Delivery, at the end,

"The Supplier must ensure that all goods are properly, safely and securely packaged and labeled for identification and safety as follows:

- a) the goods must be individually packaged for transport so that they are protected from all reasonably foreseeable condition which might cause corrosion, deterioration or physical or bearing damage during handlings and transport. All packaging and preservation materials must be supplied by the Supplier; and*
- b) each package must be clearly and indelibly inscribed with the Purchaser's name, the address of the delivery place, the Purchaser's contract number and any safety warnings for the contents."*

21. Acceptance or Rejection of Equipment

Add the following to 21.1 Notification, at the end,

"The Purchaser shall be under no obligation to give written notice to the Supplier that the Equipment is acceptable unless:

- a) *the Purchaser is satisfied that the Equipment is satisfactory and complies with the “as manufactured” drawings approved by the Purchaser; and*
- b) *all drawings and manuals required to be supplied by the Supplier, have been duly supplied by the Supplier. “*

24. Payment

Replace “24.1 Invoices and time for payment” with “24.1 Claim for Payment and time for payment”

Under 24.1 Claim for Payment and Time for Payment, make the following change.

Replace all occurrences of “an invoice” with “written claim for payment”.

26. Termination by frustration

Under 26 Termination by frustration, make the following change.

Replace all occurrences of “an invoice” with “written claim for payment”.

27. Notification of claims

Under 27.1 Communication of claims, make the following change

Replace

“As soon as practicable after a party becomes aware of any claim in connection with the subject matter of the Contract, that party shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1.”

With

“As soon as practicable and in any event not later than seven (7) consecutive days after a party becomes aware of any claim in connection with the subject matter of the Contract, that party shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1.”

28. Dispute Resolution

Replace “28.2 Conference” and contents with the following:

“28.2 Conference

Within 14 days after receiving a notice of dispute, the parties shall confer at least once to resolve the dispute or to agree on methods of doing so, including, but not limited to, mediation, conciliation, binding expert determination and arbitration, of the whole of any part of the dispute. Where arbitration is agreed method of resolution, the arbitration shall be conducted in accordance with the rules of Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers.

At every such conference, each part shall be represented by a person having authority to agree to such resolution or methods. All aspects of every such conference except the fact of occurrence shall be privileged.

If the dispute has not been resolved nor a method of resolution agreed within 56 days of service of the notice of dispute, that dispute shall be dealt with in accordance with subclause 28.3.”

Replace “28.3 Arbitration” and contents with the following

“28.3 Elevation of Disputes

If the parties are unable to resolve the dispute or agree a method of resolution in accordance with sub clause 28.2:

- a) the dispute shall be referred to the Chief Executive Officer, or a duly authorized representative, of the Purchaser and the Chief Executive Officer/Managing Director, or a duly authorized representative, of the Supplier to resolve the dispute or agree on a method of resolution;*
- b) the individuals referred to in sub clause 28.3 (a) shall meet within 14 days after referral of the dispute in an effort to resolve the dispute or agree a method of resolution;*
- c) if the individuals referred to in sub clause 28.3 (b) are unable to resolve the dispute but agree at that meeting on a method of resolution, they shall also nominate a timeframe for the commencement and conclusion of the method of resolution; and*
- d) if the individuals so referred to in sub clause 28.3(b) are unable to resolve the dispute or agree a method of resolution, each within 14 days of the dispute being referred, either parts may give written notice to the other stating that the parties have been unable to resolve the dispute or agree a method of resolution.*

Where arbitration is the agreed method of resolution, the arbitration shall be conducted in accordance with the Rules stated in Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers.”

Replace “28.4 Summary Relief” and the contents with the following:

“28.4 Instituting Proceedings

Neither party shall proceed to resolve a dispute by instituting court proceedings until issuing to, or receiving from, the other party, a notice in accordance with sub clause 28.3(d).”

Add the following after 28.4 Institutional Proceedings

“28.5 Summary Relief

Nothing herein shall prejudice the right of a party to institute proceedings to enforce payment due under the Contract or to seek injunctive or urgent declaratory relief.”

Annexure A

Replace Annexure A Part A with the form provided in Schedule C.

5 REFERENCES

5.1 Applicable Standards

The transformer shall be designed, manufacture and tested in accordance with the following Australian Standards and all amendments issued prior to the date of closing of tenders except where varied by this Specifications.

AS 1100	Drawing Practice Scales – Part 7
AS 1194	Winding Wires Parts 1 – 4
AS 1265	Bushings for Alternating Voltages Above 1 000 V
AS 1319	Safety Signs for the Occupational Environment
AS/NZS 1580	Paints and Related Materials – Methods of Test
AS 1627	Metal Finishing – Preparation and Pretreatment of Surfaces
AS 1650	Galvanized Coatings
AS 1767	Insulating Oil for Transformer and Switchgear
AS 1824	Insulation Co-Ordination
AS 1931	High Voltage Testing Techniques – Part 1
AS 2067	Substations and High Voltage Installations Exceeding 1kV AC
AS 2129	Flanges for Pipes, Valves and Fittings
AS 2312	Guide to Protection of Iron and Steel Against Exterior Atmospheric Corrosion
AS 2374	Power Transformers – Part 1 to 3, 5, 6 and 7
AS 2700	Colour Standards for General Purpose
AS 2768	Electrical Insulating Materials
AS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3750	Paints for Steel Structures
AS 4398	Insulators – Ceramic or Glass – Station Post for Indoor and Outdoor Use – Voltages greater than 1 000V a.c.
AS 4436	Guide for the selection of insulators in respect of polluted conditions
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 60076	Power transformers (including all parts and normative references as current)
AS/NZS 60137	Insulated bushings for alternating voltages above 1000 V
AS 60214	Tap-changers (including all parts and normative references as current)
AS 60270	High voltage testing techniques – Partial discharge measurements
AS 62271.200	High-voltage switchgear and controlgear - A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
AS 62271.301	High voltage switchgear and controlgear – Dimensional standardization of terminals
ISO 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
IEC 60068	Environmental Testing (All parts)
IEC 17025	General requirements for the competence of testing and calibration laboratories Production, Installation and Servicing
IEC 61619	Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography

Should inconsistencies be defined between Standards and this Specifications, this Specification will take precedence. However, significant inconsistencies shall be referred to EFL for resolution.

5.2 Applicable Laws

The Tenderer warrants (without limiting any other warranties or conditions implied by law) that all Goods have been produced, sold and delivered to EFL in compliance with all applicable laws (including all workplace health and safety and electrical safety legislations and codes of conduct).

6 SERVICE CONDITIONS

6.1 Environmental Conditions

The transformer and its components shall be manufactured to withstand the following service conditions of:

Atmosphere	:	Saliferous, corrosive and dusty
Ambient temperature	:	Peak : 40°C
	:	24 Hour Average: 30°C
	:	Annual Average: 22°C
	:	Minimum: 10°C
Relative Humidity (Average)	:	85%
Annual Average Rainfall	:	1900 mm
Wind Speed	:	Sustained : 55 m/s
	:	Gusts : 70 – 110 m/s
Isokeraunic Level	:	60 Thunder days per year
Seismic	:	To a maximum of 7 on the open-ended Richter Scale
Low voltage Supply Ratings	:	Control/Alarm/Emergency – 89V to 132V, 110V nominal Supply voltage of auxiliary equipment – 415V/240V ±5% Supply voltage of auxiliary equipment - 89V to 132V, 110V nominal

Note: All plant and equipment shall be rust proof, vermin proof and weather proof and designed to be suitable for a damp, tropical climate, which may be experienced simultaneously.

6.2 System Conditions

The rated frequency of EFL's power system is 50 Hz.

Particulars	System Voltages	
		230V/415V
Nominal System Voltage	230V (p-n), 415V (p-p)	11kV
Highest (Equivalent) System Voltage:	244V (p-n), 440V (p-p)	12kV

Number of phases:	1 or 3	3
Impulse Withstand voltage (peak):	AC 15kV rms	28kV
Power frequency withstand voltage:		95kV (peak)

EFL's 11kV system is 3 phase, 3 wire, 50 Hz. The transformer 415V neutral will be solidly grounded.

The equipment must be rated to withstand 25kA for 3 seconds on 11kV.

6.3 Seismic Disturbances

The Equipment and associated fittings must be designed to withstand the effects of shock waves and earth movements resulting from earthquakes without failure. The Tenderer must provide calculations which show the forces applied to the Equipment and its fittings under earthquake conditions in accordance with AS 1170.4, including:

- Overturning and sliding forces
- Bending moments at base of bushings
- Force on bracing between core and main tank and strength of bracing
- Details of fixing main tank to concrete plinth and strength of fixing.

6.4 Wind Loads

The Tenderer must demonstrate with calculations that the Equipment and associated fittings can withstand the pressure associated with the specified maximum wind gust as specified in AS/NZS 1170.2.

6.5 Sound Levels

The design and construction of each transformer must be such that the sound levels are measured in accordance with the AS/NZS 60076.10. The sound levels must not exceed 56dB. Tenderers will be required to provide copies of type test certificates for sound level measurements.

7 DESIGN AND PERFORMANCE CRITERIA - TRANSFORMERS

7.1 General

Generally, all design and construction of the items and their components and parts must be Fit for Purpose and Fit for Duty, including for Normal Cyclic and Emergency Cyclic Duty as described in this specification and applicable documents to prevent distortion or damage under service conditions and during handling and transport.

The transformer will be suitably stiffened and braced to prevent distortion or damage under service conditions or during handling and transport.

All sharp points on transformer exterior will be removed to prevent injury.

All bolts nuts and washers (fasteners, studs, lifting lugs etc.) will be to Australian Metric Standards and be stainless steel Grade 316 or 304. Compatibility, with regard to corrosion prevention, between the fasteners will be observed. To prevent binding, different grade stainless steel nuts and bolts will be used together with anti-seizing lubricant on all bolt threads.

7.2 Loadings

The transformer shall be loaded in service in accordance with the following:

Normal cyclic	1.0pu
Long-time Emergency Cyclic	1.5pu
Short-time Emergency	1.8pu

The overloads are in accordance with AS 2374, Part 7 and apply to well ventilated situations. Any limitations to loading above 'normal cyclic', as per Clause 1.5 of AS 2374, Part 7, shall be stated in the tender.

7.3 Oil Preservation System – Type

Sealed tank type construction will be used; however, the transformers will not be pressurized or incorporate gases other than air. Diaphragm sealing is not acceptable.

7.4 Tanks and Lids

All surfaces will be designed to prevent the accumulation of water. All seams will be electrically welded and oil tight.

On the external areas of the tank, welding of horizontal and vertical joints will be on both sides of the joint. Welding in all cases will be continuous.

All metal work will be electrically bonded to the tank to permit earthing by EFL. If a part cannot be adequately bonded it will be constructed from a suitable insulating material instead of metal.

The tanks will be so designed that with a top oil temperature of 105°C, the oil level in the tank will be below the tank lid flange. The lid of the transformer will be capable of being removed without having to take off other components first (eg. cable box) and will be capable of supporting up to 100 kg of a person's weight without permanent deformation.

The tank will incorporate all mounting studs necessary for the fitment of an LV cable box. It will also incorporate two mounting lugs sufficiently above ground level for attachment of the LV cable support bracket.

7.5 Joints and Gaskets

All joints will be oil tight. All gaskets/seals will be designed to last the intended life of the transformer. Joints in gaskets will not occur at bolt holes.

7.6 Core and Windings

The transformer will have electrically separate high and low voltage windings connected to comply with vector group Dyn11 as relevant to the items as stated in Attachment 1, of AS 60076.

The core and winding assembly will be supported by the main tank and not by the cover.

Means will be provided at both the top and bottom of the core and coil assembly for locating the transformer core centrally in the tank and securing it in position to prevent movement, particularly during transport.

The core and all metalwork will be electrically bonded to the tank. The bonding will be brought to one point only.

The insulation between the core and the frame will have a resistance no lower than 50 MΩ after assembly, and will withstand 5 kV for one minute. The core and frame will then be electrically connected together at one point only.

7.7 Tappings

The transformer shall be capable of off-circuit tap changing by means of an externally operated switch. The tapping switch shall have a permanent overload capacity of 50 percent. The tapping switch shall be located near the top of the transformer for ease of access and to readily facilitate unloading of the transformer.

Tapping shall be provided on high voltage winding. The principal tapping shall correspond to rated voltage. The tapping range for each applicable rating shall be as detailed in Appendix A with step voltages of 2.5 percent.

The tapping selector switch shall be capable of being locked into each of the positions. The locking arrangement shall be such that it is not possible to lock the switch between taps. The tap switch shall be provided with the same number of positions as tapings. However, if a tap selector switch with more positions (via extra undefined positions) is used, it shall be provided with stop pins (or similar) to prevent tap rotation into non-tap positions. Stop pins shall be of the permanently fixed type, i.e. bolts, etc. shall not be used.

Each tapping selector switch position shall be identified by a number clearly and indelibly stamped or cast onto either the switch operating handle or the transformer tank.

Tap position No. 1 shall correspond to full winding in circuit.

The tap position selector switch shall be manufactured in such a way that it may be coupled with its operating handle only in the correct manner, not 180° out of adjustment. This shall be done so no inadvertent open or short circuit can occur due to incorrect assembly following out of tank repair/inspection.

A sealing gland shall be provided on the tapping selector switch operating shaft where it passes through the transformer tank or prevent any breathing or leaking along the shaft.

The tapping switch shall be mounted in an accessible location on the transformer.

7.8 Impedance Voltage

The impedance voltage at rated current on principal tapping shall be less than 4%.

7.9 Cooling

The method of cooling each transformer shall be ONAN.

7.10 Insulating Oil

The transformer shall be supplied with standard mineral insulating oil that meets the requirements of AS 1767 and be proven to be non-corrosive by Method B of ASTM D1275-06 Standard Test Method for Corrosive Sulphur in Electrical Insulating Oils and, IEC 62535 Ed. 1.0: Insulating liquids – Test method for detection of potentially corrosive sulphur in used and unused insulating oil.

The oil shall be new, supplied direct from the oil refinery and its bulk delivery shall be certified to contain less than 1 ppm of PCBs. The supplier shall follow approved quality procedures to ensure that the oil cannot be contaminated while under their control. The Tenderer shall supply full identification, specifications and test results for any and each oil offered.

The quality of any offered insulating oil at the time of filling (i.e. on release from supplier) is such as to have a moisture content of at least <20 ppm and a Breakdown Voltage of >50kV.

The cold oil level shall be above the radiator inlet point (if radiators fitted).

7.11 Drying out and Oil Filling before Delivery

The transformer shall be thoroughly dried out at the manufacturer's works and shall be delivered filled with oil to the correct level and ready for service. All transformers shall be vacuum filled. The degree of vacuum applied to the production units shall be identical to that applied to the units that are type tested. The moisture content of the oil shall be less than 25 ppm at time of filling.

7.12 Bushings and Terminals

7.12.1 General

All bushings will comply with AS/NZS 60137, AS 4436 and the Service and Environmental Conditions as specified in this technical specification. All porcelain components will be glazed and fully vitrified.

All terminal palms will be arranged vertically and comply with AS 62271.301. They will be copper with their contact.

7.12.2 LV Bushings

The LV bushings will be mounted horizontally on the side of the transformer opposite the HV cable box.

The part of each LV bushing within the tank will be completely covered with oil when the transformer is old (with an outside temperature of 15°C), and will be readily accessible with the tank cover removed.

The distance between centre lines of the LV bushings will not be less than 200 mm for all ratings. The taut string metal to metal clearances of the bushing terminals will be not less than 100 mm, phase to phase, and 60 mm phase to earth.

The neutral connection to the star point on the secondary winding will be brought out of the tank unearthed and insulated in the same manner as the phase terminals.

7.12.3 Marking of Terminals

The terminals will be marked in accordance with AS 2374. The use of adhesives to attach marking plates will not be accepted.

7.13 HV Cable Box

7.13.1 Compliance to AS 62271

The cable box will be designed to conform with the internal arc withstand requirements of AS 62271.200 : High-voltage switchgear and controlgear - A.C. metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV, Annex A, A.2 Types of accessibility, Accessibility Type A, A.6 Acceptance criteria, Criterion No. 1 to Criterion No. 5 inclusive, for an IAC classification test current.

7.13.2 General Requirements for HV Cable Boxes

The access cover of the cable box shall be capable of being removed/installed by two persons without mechanical aids. A brushed aluminium cover fitted with suitable lifting handles is preferred by EFL. As a minimum, the top edge of the access cover shall have a return to ensure the ingress of moisture through the gasket is prevented. It is preferred that both side edges also include a return.

The minimum clearances between exposed live parts shall generally be in accordance with the requirements of AS 2067 for the required impulse withstand voltages of 200 kVp. When determining minimum clearances, due consideration shall be taken of the flexible cable connections. Where manufacturers use clearances that are less than those shown in AS 2067, type test results are to be provided by the Supplier indicating that the clearances selected are capable of meeting the above test voltages.

The design of the cable box shall be such that the cable termination connections can be left bare without the need for further insulation. The provision of easily removable phase barriers is acceptable.

Lightning impulse withstand voltage tests shall be carried out with the cable lugs suitable for the applicable cable fitted within the box (to remain fitted to transformer during test including cover) to prove compliance with the specified impulse withstand voltage level.

The cable box shall be completely weather and vermin proof and shall be adequately ventilated to eliminate the possibility of build-up of moisture internally.

The cable box shall be fitted with a removable gland plate made of aluminium, brass, or other corrosive-resistant material to the EFL's satisfaction, bolted to the underside of the cable box to allow the cables to be laid into and removed from the box without the need to thread the cables through the entry holes. This feature provides ease of jointing and facilitates the changing of transformers.

An earth bar for cable sheath earths, insulated from the transformer steelwork, shall be provided in the cable box. The earth bar shall have sufficient holes provided to allow for individual connection of each cable sheath. Provision shall be made for external connection to the earth grid.

The minimum distance from the gland plate to ground level shall be 460 mm.

The cable box front cover shall be fastened using galvanised bolts, nuts and washers.

The cable openings shall be located directly below the corresponding phase cable connection points.

7.13.3 LV Cable Box

EFL requires an air insulated cable box as standard for the LV bushings utilizing the mounting studs described in these specifications.

The cable box will maintain the clearances given in these specifications and have a detachable un-drilled gland plate made of aluminium, brass, stainless steel or other non-corrosive material that is not subject to inductive heating and fit for purpose, to EFL's satisfaction.

The cable box shall be supplied complete with all necessary accessories, supports and flexible connections suitable for termination of single or multiple 300mm² Copper or Aluminium cables as required. Additionally a 'unistrut' or equivalent type cable support bracket to accommodate neutral cables shall be provided. The bracket shall be suitable for attachment to the mounting lugs provided on the tank and shall be clear of the transformer cooling fins (if any are installed).

All necessary nuts, bolts, etc for the mounting of the bracket shall be provided. The bracket design and attachment shall be to the EFL's satisfaction.

Detail drawings of the cable boxes offered, including a list of accessories such as supports and flexible connections (expansion joints), shall be submitted with the Tender.

The LV extension palms/ flexible connectors (expansion joints)/ cable support boards must suit installation on all the Tenderer's kVA ratings listed above.

LV fuse links shall be installed in the LV cable box.

7.14 Flux Density

The maximum flux density in any magnetic part shall not exceed 1.9 Tesla with a system voltage of 110% and at a frequency of 47Hz. Transformers shall not over-flux under these conditions.

7.15 Radio and Television interference

The design and construction of the transformer shall be such that it will not cause unacceptable radio or television interference.

7.16 Fittings

The transformer shall be supplied with fittings as detailed below:

7.16.1 Rating/Terminal Marking Plate

The transformer will be supplied with a rating plate complying with AS 60076. The rating plate will be made from stainless steel (or non-ferrous metal) and be clearly marked, the lettering etched or otherwise formed in relief and colored black (except for values which vary from nameplate to nameplate) such that the lettering is in sharp contrast with the background.

The rating/Terminal Marking Plate shall be in accordance with Clause 7 and Appendix ZC of AS 2374, Part 1, and shall include a Voltage Vector Diagram. In addition it shall state:

- That the transformer is 'sealed'
- Temperature rises (even though normal values apply)
- Type of insulating oil (even though it is mineral oil)
- Impedance on principal tap only.

All quantities on the rating/terminal marking plate shall be stated in metric units.

The display of Corrosion Protection Category may be omitted on unplanned fully hot dipped galvanized units. For painted units the indication of the standard or heavy duty protection shall be given.

The rating/terminal marking plate shall be located on the side of the transformer near the tapping switch in a position that can be easily read when the transformer is in service.

7.16.2 Lifting and Transport Facilities

Lifting lugs shall be provided with a minimum hole diameter of 32 mm for:

- a. Lifting the transformer when filled with oil and ready for service, and,
- b. Holding down the transformer during transport.

The transformer tank walls shall be strengthened to allow the above. The lugs shall be positioned so that:

- a. They are suitable for connection to lifting beams;
- b. They are suitable for attaching slings, each 1 m in length. The slings may be shortened such that transformers will require the holes in the lifting lugs to be spaced not more than 1.2 m apart. The maximum enclosed angle of the slings would be 120° during any lifting procedure.
- c. Any beams or slings attached during lifting or transporting shall not foul any part of the transformer and when suspended by them the transformer shall hang by acting through the center of gravity, with a maximum angle of tilt of 2.5 degrees from the plane of the mounting brackets.

The base of the transformer shall be raised above ground level by a suitable supporting structure so that protective coating of the main transformer tank cannot be damaged during reasonable storage or transport.

All heavy parts of the transformer, including the core/coil assembly, which must be removed for inspection or repair shall be fitted with lifting facilities suitable for use with slings and shackles. (Note that an exception shall be allowed for single phase transformer provided slings can be fitted under the coil to allow for lifting).

7.16.3 Earthing Terminal

A stainless steel flag of at least 50 x 40 x 5 mm with an M14 hole will be provided near the bottom of the tank (as close as practicable to vertically below the secondary neutral terminal) in an easily accessible position. The earth flag will be welded directly to the tank.

An M12 x 40 mm Grade 304 stainless steel bolt and stainless steel nut, locknut and two flat washers will be supplied fitted to the flag.

7.16.4 Oil Level Indicator

Oil level indication shall be provided on the inside of the transformer tank (visible from the filler cap for rectangular tank units). The indication inside the tank shall take form of horizontal 50 mm long stenciled mark in contrasting colour. This indication shall include safety margin, permitting inaccuracy in mounting.

No external indicator is required.

7.16.5 Thermometer Pocket

Transformer shall not be fitted with a thermometer pocket.

7.16.6 Oil Draining

Not applicable.

7.16.7 Filler Cap

Rectangular tank transformers with multiple lid shall be fitted with a filler cap (or plug) on the lid as near as possible to one corner of the cover, such that if moisture did enter it would drop to the bottom of the tank.

Gaskets or thread sealing may be used to prevent water drops being inhaled into the transformer.

7.16.8 Tank Markings

The transformer capacity shall be stenciled in black numerals onto the tank where it can be easily seen by the stores or operations personnel. Each numeral shall be 75 mm high and have a body width of not less than 12 mm.

7.17 Spark Gaps

No HV spark gaps are required.

7.18 Protective Coating

EFL requires all internal and external surfaces to be protected against corrosion.

The external corrosion protection for all items shall suit Long Term Corrosion Protection in Atmospheric Classifications of "Mild", "Moderate" and "Tropical" per clause 2.2 of AS 2312.

EFL intends to install the transformer in severely populated industrial or marine environments, therefore the Tenderer should provide the additional costs (if any) associated with additional heavy duty protective coating.

The final colour, except when surface is galvanized and unpainted, shall be storm grey, N42 to AS 2700.

The paint system must be a proven one, fully documented and applied by trained and experienced personnel.

The Tenderer shall guarantee protective coating system for a minimum period of five (5) years from commissioning against corrosion which would require repair/replacement of the transformer. In such case, the normal warranty provision shall apply, with all associated costs to be borne by the manufacturer. Warranty provisions would only apply if the transformers are installed in the appropriate environment.

Warranty claims would cover any transformer requiring replacement due to corrosion as well as the repair of rusty tanks in situ to prevent the premature need to replace units. Repairs in situ would normally be performed by EFL. Providing one week notice is given to Tenderer to investigate, all labour and material costs (but excluding consequential costs) would be passed from EFL to the Tenderer on a recoverable basis.

The successful Tenderer shall provide details on the method of protective coating repair to allow EFL to carry out touch-up (before commissioning) and field maintenance.

The surface coating inside the transformer tank shall not react with unpassivated transformer mineral oil (including additives if applicable).

7.19 Transformer Losses

Guaranteed load and no-load loss figures are to be lower than specified values below:

- No load loss - $\leq 0.2\text{kW}$
- Load loss - $\leq 0.8\text{kW}$

Load losses are to be corrected to a reference temperature of 75deg C.

8 TESTING

8.1 Testing Requirements

Prior to delivery, the units shall have completed the type, routine and accuracy tests and inspections as required by the relevant international and Australian standards. The passing of such tests shall not prejudice the right of EFL to reject the Equipment if it does not comply with the Specification when received or installed.

All testing shall be undertaken by an IEC 17025 accredited test house. The Tenderer shall submit evidence showing IEC 17025 compliance. A formal report covering the outcome of the different tests shall be made available to EFL.

8.2 Type Test Obligations

A copy of the type test certificates shall be provided upon request, free of charge, to EFL. If the offered transformer was not tested in the past, the tests to be performed on units purchased at the Supplier's expenses.

Should EFL require any test(s) to be repeated despite the earlier certificate being available for an identical (or similar, as allowed below) unit, the cost of such test will be borne by EFL.

Where units are offered of a similar design to those previously tested, EFL may consider (in accordance with AS 2374, Part 1, Para 3.11.2) to accepting previous type test reports. The Tenderer shall state if such tests, that would qualify for consideration, exist.

The Tenderer may be requested during the tender evaluation period to substantiate that claim with written engineering evaluation. Such evaluation shall provide all relevant details permitting EFL to establish validity of existing type tests.

Any modification, resulting from a type test failure or change of design instigated by the Supplier or change of design to comply with the specification, which could affect the result of earlier type tests, shall require a repeat of such earlier type test. Any repeat type tests to provide compliance with the Standard's requirements shall be to the Supplier's cost.

8.3 Type Tests

The following type tests, as specified in AS 2374 or elsewhere in the specification, shall be conducted on the offered transformer:

AS2374	Clause No.
1. Temperature rise test	Part 2 – Clause 5
2. Impulse voltage withstand test	Part 3 – Clause 13
3. Impulse voltage withstand test including chopped wave test	Part 3 – Clause 14
4. Sound level tests	Part 6 – Clauses 5, 6, 7
5. Pressure test on sealed transformer	Clause 6.4 of specs
6. Short circuit test	Part 5

Extrapolations of temperature rise for guaranteed load and no-load losses shall be incorporated in the test report to verify conformance. During the test, sealing around thermometers, etc. shall be adequate to ensure the units are sealed during the test. Also, tap switch operation shall be free, i.e. not over tightened during the test. Internal pressures shall be measured and recorded.

Oil leaks during temperature rise tests would constitute failure of the test.

To prove the sealed transformer is adequately designed and sealed, the following type test shall be required on each fully assembled transformer:

- Establish and monitor internal transformer pressure. The test pressure shall equal the maximum pressure stated on the rating plate.
- If, after 30 minutes, the pressure has not dropped more than 2 kPa, the transformer will be considered to have passed the test.

Ambient temperature variation shall be within $\pm 2^\circ$ C.

8.4 Routine Tests

The following tests, as specified in AS 2374, shall be carried out:

AS2374	Clause No.
1. Measurement of winding resistance	Part 1 – Clause 10.2
2. Ratio and phase relationship checks	Part 1 – Clause 10.3
3. Impedance voltage, short circuit impedance and load losses	Part 1 – Clause 10.4
4. No load loss and currents	Part 1 – Clause 10.5
5. Induced over-voltage withstand	Part 3 – Clause 12
6. Separate-source voltage withstand	Part 3 – Clause 11
7. Insulation resistance	Part 3 – Clause 16

8.5 Batch Tests

All conductors shall have been inspected and tested in accordance with AS 1194. The dielectric strength of oil is to be tested in accordance with AS 1767.

8.6 Porosity tests

Porosity tests shall be carried out by the Supplier or their subcontractor for porcelain components in accordance with the requirements of Clause 5.6 of AS 4398, Part 2.

8.7 Acceptance tests

EFL reserves the right to repeat any or all tests (subject to AS 2374 provisions and at EFL's Cost) during their acceptance test stage.

8.8 Witnessing of tests

The Tenderer shall make allowance for one EFL Engineer to witness the type tests which shall be requested to be performed. All costs for the witnessing of such type tests shall be borne by the Tenderer.

The Tenderer shall also make allowance for witnessing of routine tests by one EFL Engineer.

Where applicable, the Supplier shall give EFL not less than four (4) weeks' notice of when each and every type test will be carried out.

8.9 Test certificates

Two certified copies of all test results shall be supplied to EFL. Electronic copies shall also be submitted.

All test certificates shall include the manufacturer's serial number. On allocation, the corresponding EFL transformer number, the order number, contract number, item number, specification number and guaranteed losses must be added to the certificate, or attachment to the test report.

9 RELIABILITY

9.1 Service Life

Tenderers are required to comment on the reliability of the equipment and the performance of the materials offered for a service life of 35 years under the specified system and environmental conditions.

9.2 Spare Parts and Maintenance

The Supplier shall supply a list of recommended spare parts, special tools and appliances required for the whole of life operation and maintenance of the transformer installation. The list, together with prices, shall be indicated in the appropriate schedule. The Supplier must also provide details (if required) of the recommended maintenance and the frequency at which it must be carried out. Details of the manufacturers repair capability and options shall be provided

9.3 Evidence in Support of Reliability

The Supplier shall indicate and provide updates to EFL the mean time between failures (MTBF) of the transformer and its components including the recommended maintenance regime and maintenance tasks and intervals. This regime shall be based on the mean time between failure (MTBF) and the critical failure modes identified by the failure mode, effects and criticality analysis (FMECA) of the equipment. Details substantiating the FMECA analysis shall be included in the offer.

Such comments will include evidence in support of the reliability and performance claimed including information on Failure Mode and Effect Analysis.

10 PROGRAM AND PROGRESS OF WORK

The Tenderer shall provide a work program with its bid in the format as given in the Schedules of this specification. Within seven days of the receipt of the official EFL purchase order, the Tenderer shall submit a confirmed programme of work for the entire project upto the delivery. The programme is to conform to the timelines as stipulated in this tender.

The successful Tenderer shall also be required to submit fortnightly reports on the status of various activities during execution of contract. Such reports shall be submitted within five (5) calendar days of start of the month.

11 ENVIRONMENTAL CONSIDERATIONS

Tenderers are required to comment on the environmental soundness of the design and material used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposal at end of service life.

EFL may require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various Environmental protection practices in the design, manufacturing, testing and supply of transformers.

12 PACKAGING AND MARKING

The packaging of items by the Tenderer must ensure that they are capable of being delivered undamaged giving due consideration to the quantity, distance of transportation and the preferred method of handling at each location.

The Tenderer shall take all necessary precautions to ensure safe handling of all transformers and associated accessories supplied.

13 QUALITY SYSTEM REQUIREMENTS

Bidders are required to submit evidence that the design, manufacture and testing of the transformers are in accordance with ISO 9001. Manufacturers, and bidders where a bidder is representing a manufacturer, is required to be ISO 9001 accredited and have a current certificate at time of bidding.

Documentary evidence shall be provided concerning the level of Quality System Certification associated with the supplier and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

EFL may require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various quality management practices in the design, manufacturing, testing and supply of transformers.

14 OCCUPATIONAL HEALTH AND SAFETY SYSTEMS

Tenderers are required to submit copies of certification to occupational health and safety management system, such as AS 4801 or to equivalent international standard ISO 45001. Such information is deemed mandatory bid submission and lack of it will result in disqualification of bid.

Tenderers are also required to submit evidence of certification to ISO 14001.

In addition to this, Tenderers also need to submit health and safety plans implemented in factories for design, manufacture and testing of the transformers, which will be used in this project.

15 PRODUCT WARRANTY PERIOD

The Tenderer shall provide warranty for equipment supplied and workmanship for the transformer for a Period of twelve [12] months after delivery of the equipment. For all equipment supplied by third-parties, the Supplier is to ensure that the warranties of these equipment are transferred to EFL as the beneficiary, particularly the protection relays.

The Supplier warrants to the Purchaser that all Works performed and completed in respect of the Warranted Works are in accordance with the standards and quality specified in the Contract or if not otherwise specified, the work is according to good trade practice expected in the energy industry.

16 INFORMATION TO BE SUPPLIED BY THE TENDERER

16.1 Documentation to be supplied with the tender

To enable EFL to fully evaluate the transformer(s) offered, (in addition to the completed Specification Requirement and Guaranteed Performance schedules) the Tenderer will submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities for at least the past ten years
- Typical arrangement drawings and full details of the dimensions of the transformer
- Type test certificates for the transformer offered, or transformers of similar design and rating (if available)
- Typical loading curves (for loading transformers in accordance with AS 2374, Part 7)
- Short circuit test details for equipment of similar design and rating
- Sample inspection and test plans for the transformer
- Typical installation and maintenance manuals
- End of service life disposal method
- Calculations for MEPS efficiencies
- Seismic ratings and calculations
- Wind load calculations
- Full details of the protective coatings offered
- A list of all departures of the tender from this specification
- Evidence of quality management systems used in manufacture, testing and supply
- Evidence of Health, Safety and Environmental plans
- Evidence of financial ability to provide the level of service and support
- Origin of materials used in manufacture of the transformer
- Detailed procedure for receiving, handling, lifting and storage
- Names and resumes of key team members who will be assigned to work with EFL upon successful award

Where sub-contractors are used, the Tenderer shall provide the above information for the sub-contractors as well.

Tenderers may be asked to provide additional information during tender assessment period or following award of contract.

SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

A.1 Previous Experience

The Tenderer is to submit a list of Projects worked under with a similar scope, involving the design and manufacture of transformer, in chronological order of year completed.

Client	Project Scope and Description	Approx. Project Value	Year Completed

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

A.2 Project Personnel

The Tenderer is to submit list of personnel who will work on this project and also provide their resumes in its bid.

Name	Designation	Duration of Employment with Company	Years of Experience

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

A.3 Financial Statements

The Tenderer shall also submit past three years audited financial statements and records showing its financial ability to undertake this project.

SCHEDULE B: PRICE AND PAYMENT SCHEDULE

Currency of Tendered Price:

Component	Unit Price	Quantity	Total Price
Design, Manufacture, Testing and Supply of 1x 100kVA, 11kV/0.415kV Ground-mounted transformer		1	
(Tenderer to add other items as required)			
Total			

The Payment Schedule shall be as per the table below:

Milestone	Percentage	Amount in Dollars
Receipt of Goods by EFL	95%	
Expiry of Warranty period (12 months after receipt of Goods)	5%	

Total Contract Price (in Words):

.....

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE C: AS 4911 ANNEX A (TO BE SUBMITTED BY TENDERER)

All Tenderers are required to complete and submit a copy of this form with their bid submissions.

Item		
1	Purchaser (Clause 1)	Energy Fiji Limited (EFL)
1A	Purchaser's Representative (Clause 1A)	To be nominated by EFL at time of contract.
2	Purchaser's Address	2 Marlow Street, Suva
3	Supplier (clause 1)	Supplier to provide
4	Supplier's Address	Supplier to provide
5	Stated purpose for equipment (clause 1 definition of acceptable)	As stated in tender specifications and/or purchase order
6	Period of time for delivery (Clause 1 and Sub-clause 19.1)	Supplier to provide
7	Delivery Place (Clause 1 and Sub-clause 19.1)	EFL's Kinoya Depot, Kinoya, Suva
8	Mode of Delivery (Sub-clause 19.1)	Supplier to provide
9	Governing Law (Clause 1(h))	Laws of Fiji
10	a) Currency (clause 1(g))	Supplier to provide
	b) Place for payments (clause 1 (g))	Supplier to provide
	c) Place of Business of bank (clause 1(d))	Supplier to provide
11	Limits of Quantities to be supplied and delivered (clause 2.2)	As stated in tender specifications and/or purchase order
12	Suppliers security	Not applicable
13	Purchaser's security	Not applicable
14	Purchaser supplied documents (sub-clause 6.2)	Tender specifications and addenda (where issued).
15	Supplier Supplied documents (sub-clause 6.3)	Supplier to provide
16	Time for Purchaser's direction about documents (sub-clause 6.3(c))	14 calendar days
17	Sub-contract work requiring approval (sub-clause 7.2)	All work.
18	Legislative Requirements, those excepted (sub-clause 10.1)	Not applicable
19	Reference date (clause 1, sub-clause 10.2(b))	Deadline for Submission of Bids, as defined in tender specifications
20	Time by which insurance cover for the Equipment is to be effected (sub-clause 13.1)	Prior to tender award.
21	Public and product liability insurance (sub-clause 13.2)	Supplier to provide

22	Qualifying cause of delay, causes for which EOTs will not be granted (page 3, subparagraph (b) (iii) of Clause 1 and subclause 17.2)	None.
23	Liquidated damages, rate (subclause 17.5)	0.5% per day upto 10% of the purchase order value
24	Delay Damages	As assessed by EFL
25	Date for completion of acceptance testing (subclause 18.1 and 21.1)	As stated in tender specification
26	Party responsible for unloading the <i>Equipment</i> (subclause 19.1)	Supplier
27	When risk in the <i>Equipment</i> passes (subclause 20.1)	At time of acceptance by Purchaser.
28	Time at which ownership of the <i>Equipment</i> passes to the Purchaser (subclause 20.2)	At time of acceptance by Purchaser.
29	Period for <i>Purchaser's</i> notice that <i>Equipment</i> are rejected (subclause 21.1)	14 calendar days
30	Period for <i>Purchaser's</i> notice accepting or rejecting <i>Supplier's</i> proposal (subclause 21.4)	14 calendar days
31	Defects liability period (clause 22)	12 months
32	Claim for Payment (subclause 24.1)	Within 5 days of delivery
33	Period for Payment (subclause 24.1)	30 calendar days from time of acceptance by Purchaser
34	Equipment for which prepayment may be claimed (subclause 24.2)	Nil.
35	Interest rate on overdue payments (subclause 24.5)	Nil.
36	Arbitration (subclause 28.3)	
	a) Person to nominate an arbitrator	President of Fiji Institute of Engineers
	b) Rules for arbitration	Laws of Fiji
37	The <i>Supplier's</i> liability is limited as follows (clause 29)	The contract sum as adjusted pursuant to the Contract
38	The <i>Purchaser's</i> liability is limited as follows (clause 29)	The contract sum as adjusted pursuant to the Contract

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE D: GUARANTEED PARTICULARS

Tenderers shall complete and submit technical particulars below.

Technical Parameter	Units	Required	Offered
Rated Power	kVA	100	
Number of Phases	3	3	
Country of Manufacture of complete transformer			
Standard to which it is manufactured		Sect. 5 & 7 of Specs	
Rated Voltage HV Windings: LV Windings:	V V	Sect. 5, 6 & 7 of Specs	
Impedance Voltage at rated current on principal tapping	%	<4%	
No Load Loss	kW	<0.2kW	
Load Loss @ 75 DegC	kW	<0.8kW	
Category of Insulation		Uniform	
Power Frequency Insulation Level (HV/LV)	kV - rms	28/15	
Impulse Withstand Voltage (1.2/50 micro-sec)	kVp	95	
System Prospective Fault Level			
HV		25kA/3sec	
LV		15kA/2sec	
Maximum Flux Density (for all tap positions, at Um)		1.9T	
Winding Conductor Type			
High Voltage:			
Low Voltage:			
Magnetizing Current (% of full load)	%	<0.05%	
Sound Power Level dB (A)	dB	<56dB	
Tan Delta Measurement		<0.005	
Pressure Test			
Volume of Insulation Oil	Litres		
Does insulating oil comply with AS 1767/IEC 60296 and non-corrosive?	Yes or No		
Brand of oil used			
Method of Filling			
PCB in oil detection limit	Ppm		
Oil Preservation System – Type			
Maximum Total Mass	Kg		
Offload tap Changer	Required		
Manufacturer			
Type/designation			

Tappings			
Maximum Dimensions: Width (including Base) Length Height (including base) maximum, interchangeability requirements have changes-	mm mm mm		
Guard provided over transformer radiators			
All bolts (Fasteners, Studs, etc.) nuts and washers 316/304 grade stainless steel?			
Tamper proof bolts used for all unenclosed components accessibility to the public?			
Serviceable life expectancy	Years	>35yrs	
Inspection free interval	Years	>5yrs	
Maintenance free interval	Years	>5yrs	
Minimum insulation resistance at 20°C (1 kV test after 1 minute) for HV Winding: LV Winding:	MΩ		
Continuous permissible overvoltage at any tap	%	110% Ur	
Continuous Max. Temp Rise			
Top oil by Thermometer		60deg C	
Windings (by resistance)		65deg C	
Windings hot spot			
Localised tank, core, frames & fittings			
Power efficiency at 50% load	%		
Clearance in air (minimum) LV Phase – Phase LV Phase – to – earth (and Neutrals)	mm mm		
HV Phase – phase HV Phase to earth (and neutral)	mm mm		
Material Thickness			
Tank sides/floor	mm		
Lid	mm		
Fins	mm		
Maximum deflection of side walls	mm		
Terminals and Bushings			
(a) HV Winding			
Bushing type			
Manufacturer			
Bushing rating (kV/Amps)			
Pollution performance		31mm/kV	
Bushing terminal type detail/drawing			
(a) LV Winding & Neutral			
Bushing type			
Manufacturer			

Bushing rating (kV/Amps)			
Pollution performance			
Bushing terminal type detail/drawing			
LV Fuse Link Type			
LV Fuse Link Manufacturer			
LV Fuse Link Rating			
Positive sequence impedance as vector coordinates: (Rectangular form: $Z(\Omega)=R(\Omega)+jX(\Omega)$)			
Zero sequence impedance as vector coordinates: (Rectangular form: $Z(\Omega)=R(\Omega)+jX(\Omega)$)			
Sample Routine Test Reports Provided and complying with AS2374 or AS60076:			
Type of Corrosion Protection / Protective Coating Layer Details?			
Thickness of Layer of Protective Coating			

SCHEDULE E: PROGRAMME OF WORK

The Tenderer is required to state the commencement and completion dates for different components of the project schedule given below. The Tenderer is required to also submit a Gantt chart showing the timelines in weeks for supply of the transformer. The expected date for issue of a purchase order is 1st April 2021.

Component or Work	Commencement Date	Completion Date
1. Receipt of Official Purchase Order		
2. Submit Design Drawings and Design Report		
3. Manufacture of Transformer		
4. Factory Testing of Transformer		
5. Dispatch from Factory and Shipping to designated delivery point		
Total Duration of Project in Weeks (from time Purchase Order is issued)		

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE F: EVALUATION CRITERIA

Tender Evaluation Criteria	
Category	Criteria
Bid Responsiveness	General responsiveness of bid, compliance to submission requirements and documentation
Health, Safety & Environment	Assessment of Tenderer's compliance to health, safety and environmental requirements detailed within the technical specification. Past performance of Tenderers. Manufacturer holds third party accreditation to ISO 14001, ISO 45001
Quality Assurance	Tenderer holds third party Quality Assurance accreditation to ISO/AS/NZS 9001:2015. Tenderer has Quality Management systems in place that are acceptable to Energy Fiji Limited.
Technical Compliance	Does the Tender meet Energy Fiji Limited's minimum technical requirements as outlined in the Technical Specification? <ul style="list-style-type: none"> • Equipment and all components • Performance of equipment and all components • Sustainability and ease of operation • Reliability data • Past experience • Ability to deliver on time / delivery timeframe
Commercial Compliance	Tenderer holds the required current insurance provisions and has provided evidence through valid insurance certificates of currencies. Has the Tenderer submitted Departures to the Terms and Conditions? If so is it likely that Energy Fiji Limited will be able to negotiate agreement without undue delay? Assessment of the Tenderers operational risks including conflicts of interest. Tenderer must comply with statutory requirements, such as that enforced by FRCS, FNPF, FNU, etc. and provide evidence of compliance as required in the specifications.
Energy Fiji Limited Procedures	Tenderer must comply with all relevant Energy Fiji Limited safety and environmental procedures. This is indicated by the Tenderer signing the Form of Tender Schedule, acknowledging all applicable procedures. Tenderer must also comply with the requirements of Electricity Act (2017), Electricity Regulations (2019).
Financial Stability	Assessment of Tenderer's current financial stability and ability to remain financially stable.
Price Evaluation	<ul style="list-style-type: none"> • Base tendered prices; • Other value adding options.

